

N<sup>o</sup> 21,024



A.D. 1909

Date of Application, 14th Sept., 1909

Complete Specification Left, 26th Nov., 1909—Accepted, 17th Feb., 1910

PROVISIONAL SPECIFICATION.

Improvements in Dyeing and Washing Machines.

I, NINIAN KEMP, of "Avondale," Bristol Terrace, Galashiels, in the County of Roxburgh, Scotland, Dyer and Finisher, do hereby declare the nature of this invention to be as follows:—

This invention has for its object improvements in wool and yarn dyeing and washing machines of the type in which a cage for holding the material is supported in a tank or boiler and in which the dye or washing liquor is caused to circulate through the cage from the top to the bottom thereof by causing the liquor located in the space between the cage and tank or boiler to be forced upwards so as to fall over and into the cage or inner tank.

This object has previously been accomplished by means of steam issuing through perforations in a steam pipe for heating the liquor. In this case however it is found that the circulation is not set up till the liquor is brought to the boil.

By the present invention the liquor is caused to circulate in the cold by placing upwardly directed nozzles on the steam pipe so that the steam issues therefrom with sufficient force to cause the liquor to circulate when cold. At the same time of course the steam which is issuing from the nozzles gradually heats up the liquor to the desired temperature. If desired however the previously used form of steam pipe can be retained and an additional steam pipe used which is provided with the nozzles above described. In this case the steam pipe with the nozzles is brought into action by itself or with the perforated steam pipe and a circulation maintained by the steam issuing through the nozzles until the liquor is brought to the boil after which the steam issuing from the perforated pipe will keep the liquor in circulation. In cases where it is desired to use the dye or other liquor at a temperature below boiling point air under pressure can be forced through the nozzles above referred to or a separate air pipe provided with nozzles may be used and only sufficient steam allowed to issue from the steam pipe to keep the liquor at the desired temperature.

Dated this 13th day of September, 1909.

For the Applicant,

W. P. THOMPSON & Co.,  
Chartered Patent Agents,  
77, Market Street, Bradford.

COMPLETE SPECIFICATION.

Improvements in Dyeing and Washing Machines.

I, NINIAN KEMP, of "Avondale," Bristol Terrace, Galashiels, in the County of Roxburgh, Scotland, Dyer and Finisher, do hereby declare the nature of this  
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invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has for its object improvements in wool and yarn dyeing and washing machines of the type in which a cage for holding the material is supported in a tank or boiler and in which the dye or washing liquor is caused to circulate through the cage from the top to the bottom thereof by causing the liquor located in the space between the cage and tank or boiler to be forced upwards so as to fall over and into the cage or inner tank.

This object has previously been accomplished by means of steam issuing through perforations in a steam pipe for heating the liquor in which case it has been found that the circulation is not set up till the liquor is brought to the boil, while in another case it has been suggested to cause the circulation of the liquor when cold by providing a subsidiary or additional boiler which is mounted on the side and connected to the usual vat at the top and bottom and provided with an injector like apparatus for forcing the liquor in this subsidiary or additional boiler to the top and causing it to overflow therefrom into the vat and be drawn therein from the bottom of the vat.

By the present invention the liquor is caused to circulate in the cold by placing upwardly directed nozzles on the steam pipe so that the steam issues therefrom with sufficient force to cause the liquor to circulate when cold. At the same time of course the steam which is issuing from the nozzles gradually heats up the liquor to the desired temperature. If desired however the previously used form of steam pipe can be retained and an additional steam pipe used which is provided with the nozzles above described. In this case the steam pipe with the nozzles is brought into action by itself or with the perforated steam pipe and a circulation maintained by the steam issuing through the nozzles until the liquor is brought to the boil after which the steam issuing from the perforated pipe will keep the liquor in circulation. In cases where it is desired to use the dye or other liquor at a temperature below boiling point air under pressure can be forced through the nozzles above referred to or a separate air pipe provided with nozzles may be used and only sufficient steam allowed to issue from the steam pipe to keep the liquor at the desired temperature.

In order that the invention may be fully understood reference will now be had to the accompanying drawings in which:—

Figure 1 is a sectional elevation and

Figure 2 a sectional side view of a rectangular tank to which the present invention has been applied.

Figure 3 is a plan view of a circular tank.

Figure 4 is an enlarged detailed view of a nozzle while

Figure 5 is an enlarged detail view of a nozzle showing it combined with a bell shaped funnel.

In these drawings *a* is an outer tank and *b* an inner tank or cage. *c* represents the pipe for conducting the steam into the liquor in the outer tank *a*. *d* are the nozzles shown in detail and on an enlarged scale in Figures 4 and 5. *e* is a funnel shaped pipe shown in Figure 5 which may be used for assisting the action of the nozzle *d*. It will be obvious that on steam being forced into the pipe or pipes *c* it will owing to the nozzles *d* be projected upwards with considerable velocity and will impart its momentum to the surrounding liquid and cause it to flow upwards over the edges of the inner tank or cage *b* withdrawing it from the underside of the inner tank or cage *b* and so causing a circulation of the liquid through this inner tank or cage *b*. As shown in Figure 2 the baffles *f* are preferably used for guiding the liquid over the top of the inner tank or cage *b* and for preventing it being forced over the sides of the tank *a*. It is hardly necessary to illustrate the arrangement of the double set of pipes, one set being arranged with nozzles and the other simply with perforations, as these two sets of pipes will simply be arranged so as to lie side by side in such a way as to be

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able to be brought into action individually or jointly. There are preferably as shown in the drawings two sets of pipes used in order to equalise to a certain extent the pressure of steam and therefore the velocity of the issuing jets. If desired the pipes may be graded, that is to say, may be arranged so as to  
5 gradually decrease in diameter towards the nozzle farthest away from the inlet to still further equalise the velocity of the issuing jets of steam.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

10 1. The improvement in wool and yarn dyeing and washing machines of the type in which a cage for holding the material is supported in a tank or boiler and in which the dye or liquid is caused to circulate, which consists in arranging nozzles on the pipes for leading steam into the outer tank so that the jets of steam caused by the nozzles can owing to their velocity cause the liquor to circulate  
15 substantially as described.

2. In a dyeing and washing machine of the type described the arrangement of a steam or air pipe provided with a series of nozzles in combination with a steam pipe formed with perforations in any known manner.

20 3. In a dyeing and washing machine of the type described the arrangement of a pipe provided with nozzles in combination with means for forcing steam or air into the pipe and so through the nozzles.

Dated this 25th day of November, 1909.

For the Applicant,

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W. P. THOMPSON & Co.,  
Chartered Patent Agents,  
77, Market Street, Bradford,  
6, Lord Street, Liverpool, and  
285, High Holborn, London, W.C.

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KEMP'S COMPLETE SPECIFICATION.

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[This Drawing is a reproduction of the Original on a reduced scale.]

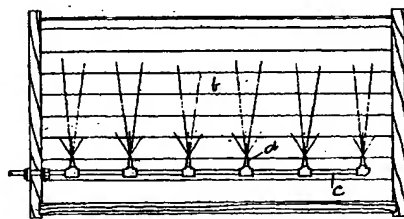


Fig. 1.

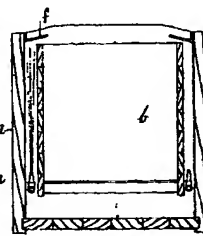


Fig. 2.

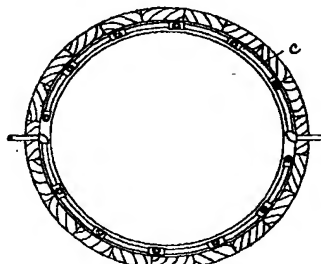


Fig. 3.

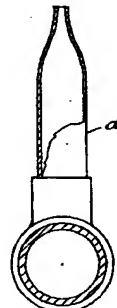


Fig. 4.

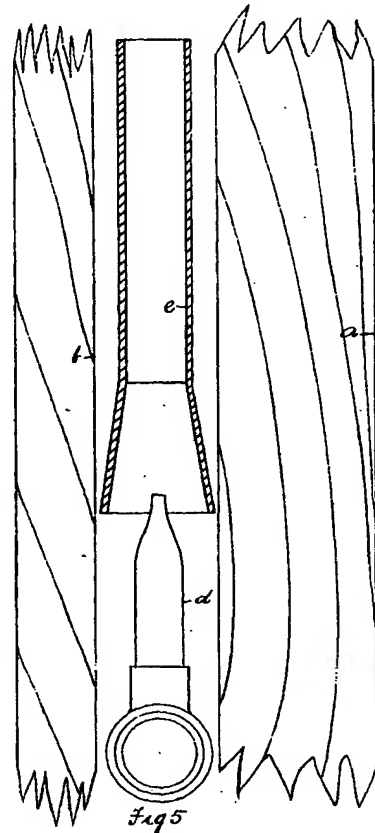


Fig. 5.

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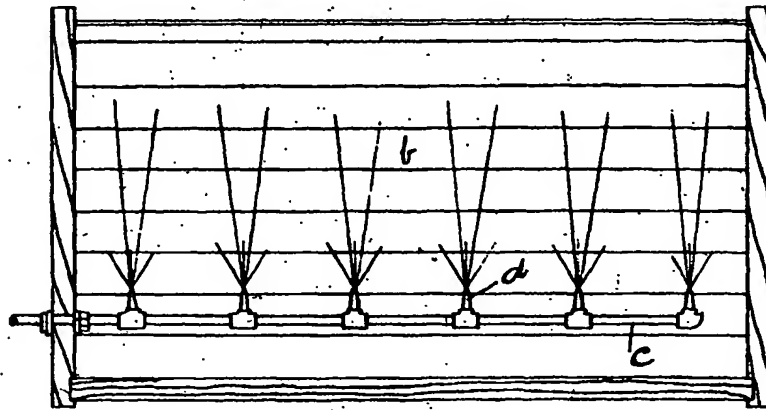


Fig. 1.

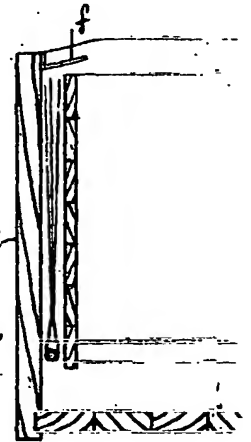


Fig. 2.

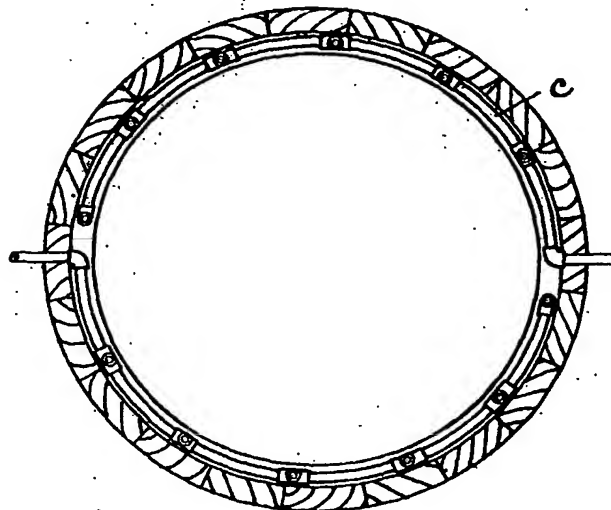


Fig. 3.

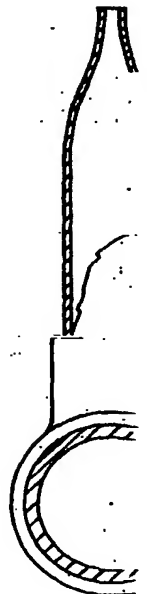


Fig. 4.

